An Introduction to Destructive Coordination

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Introduction

The concept of 'mode of coordination' captures the way in which the economy is embedded in a society. An analysis in terms of the prevailing modes of coordination may shed light on the particular institutional arrangement through which human activities are co-ordinated in a particular economy. In this vein, Polanyi (1944, [1957] 1968, pp. 148-49) has employed 'forms or patterns of integration', Lindblom (1977) speaks of 'control mechanisms,' and Kornai (1984, 1992) refers to 'modes of coordination'[2i]. All these authors conceive the economy as an 'instituted process' and emphasize the inseparability of politics and economics in "the analysis of basic social mechanisms and systems" (Lindblom, 1977, p. 8).

Three main typical or ideal modes of coordination have been identified in the literature:

[1] This paper is dedicated to my late pen friend Iraj Imam (1944-2007) who was a Universalist and a truth-seeker. I would like to thank two anonymous referees for their valuable comments and Professor Ekkehart Schlicht to whom I am indebted for his numerous precious remarks and suggestions including the references to Kazan's movie and to Dostoyevsky's work and his moral support. Once again, this paper like my other works could not exist in its present form without my parents' (Regine and Asghar) support as well as my first reader's (Sylvie Lupton) feedback and encouragement, and without my sister's (Mandana *loti ba marefat*) feedback and assistance. All my thanks also go to Bernard Chavance, Cynthia Damba (*Mugande Wange*), Christophe Defeuilley, Estelle Gozlan, Nasser Mohajer, Sara Pak, and Mohammad Reza Shalgooni for their inspiring and insightful remarks on different parts of the paper. Obviously, all the remaining errors are mine.

1) The *Market mode of coordination* refers to social organisation through exchange and markets. Polanyi (1944, [1957] 1968) and Lindblom (1977) coin this form of integration as 'exchange' which requires a specific institution, namely a system of price-making markets.

2) The *Bureaucratic mode of coordination* refers to social organisation through the authority of the government. This type of coordination is one of the variants of Polanyi's (1944, [1957] 1968) 'redistribution'. It requires of some kind of religious or political centre, such as the state, that appropriates resources and then redistributes them.

3) The *Ethical mode of coordination* refers to social organisation through 'reciprocity' (Polanyi, 1944, [1957] 1968). Polanyi's use of the term, reciprocity relates to an overarching social pattern. In that, it differs from modern usage that refers to bi-lateral interaction.

A typical or ideal model is of course an abstraction that selects a group of closely related elements from real world mixed systems. There is no real social system that can be exclusively coordinated by only one of these modes of coordination; rather, any given society may be analyzed in terms of a certain combination of these modes of coordination. However, the study of these known modes of coordination is not the focus of this paper.

Our purpose is to introduce a further type of coordination: the 'destructive mode of coordination'. *It is social coordination through intimidation, threat and the use of non-institutionalized coercive means*[ii]. In this type of coordination, resources and human efforts are allocated to *appropriate* what other people produce. Strictly speaking, non-institutionalized coercion refers to coercion unsupported by the law or the state. Yet in a broader sense, it also embraces coercion used by rival, contending parallel institutions. A "state of exception" as described by Agamben (2005) fits into this broader definition of non-institutionalized coercion. It lends credence to the foundational role of organized violence that precedes the emergence of law. The term 'destructive' refers to conflictual and aggressive

nature of a relationship that entails physical or moral destruction[iii]. Moreover, appropriation through piracy, confiscation, etc. connotes ownership of resources by disregarding, violating, annihilating, or excluding the property rights of others. Accordingly, the term 'destructive' also captures the establishment of the right to destroy or *abusus* as the ultimate boundary of property rights. This type of coordination has been almost entirely neglected in the mainstream economics, although some of its important aspects have been addressed by two particular strands of economic thought, namely the Public Choice School and the Rational Conflict Theory. A rapid overview of the literature is thus warranted in the first part to trace the theoretical background of our findings.

In studying the destructive mode of coordination, it is useful to commence by considering simple illustrations. Hence, in the second part, destructive coordination will be discussed and compared with other types of coordination using two examples: traffic circles (roundabouts) and prisons. In the third part, appropriation through pirating will be discussed as a further mechanism of destructive coordination. Biopiracy (blood patenting) will be first examined in order to clarify the relationships between *destructive coordination* and the institutionalisation of property rights. Then, we will tackle the question of rivalrous or complementary relationships between different modes of coordination and focus on disarticulation among them in the absence of a dominant mode. It will be argued that destructive coordination should be conceived as a mechanism that emerges in a transitional period marked by institutional vacuum. It may persist, but may also provide the soil where the other modes of coordination may take root.

1. Theoretical background

Destructive coordination as a form of social integration is about cooperating to coerce. The resource *allocation* in this type of *coordination* is appropriative and is based on predatory, grabbing or confiscatory activities. This type of coordination has been neglected in the

mainstream economics for a long time, although "grabbing" activity as an *allocation* mechanism has received some attention in the Rational Conflict theory since the early fifties. In fact, Economic theory endeavoured first to integrate *rational* (and not real or "social") conflicts as a source of appropriation. Haavelmo (1954) pioneered a canonical general equilibrium model of the allocation of resources among appropriative and productive activities. The model was further developed, during the last four decades, in a variety of ways by game theoretical models of rational conflict (Boulding, 1962; Schelling, 1963), and different strands of new political economy (Hirshleifer, 2001) within a partial equilibrium framework. Their goal was to understand *rational* conflict which did not entail *real destruction*. Rational conflict refers to *threat power* and can be defined as a bargaining procedure without any real clash or conflict between the parties that are both partners and adversaries (such as negotiations on nuclear power, commercial negotiations within the GATT or WTO, and negotiations between institutionalized trade unions and employers' organizations on wage and work conditions). A general review of these models of "rational" conflicts (Vahabi, 2004) shows that in equilibrium, they are "neutral" and have no effect on economic performance. In a sense, "rational" conflicts are similar to "money", they disappear in equilibrium.

A second version of conflict theory has been developed by the founders of the Public Choice School, notably by Bush (1972), Bush and Mayer (1974), Olson (1965, 1982) and Tullock (1972, 1974 a,b) in order to tackle genuine political violence. They have studied not only *threat power* but also *real* conflictual situations such as revolutions, wars, and terrorist activities. Their goal was to extend the Neo-Classical assumptions to other fields of social

science such as politics. They thus endeavour to incorporate *real* conflicts in the Neo-Classical analysis and provide a theoretical framework for a New Political Economy. Real conflicts are not neutral, and have a clear impact on economic performance, since they come within the scope of rent-seeking activities.

The theoretical background of "cooperating to coerce" (Cowen and Sutter, 2007) should be sought in the theory of anarchy pioneered by Bush (1972), and introduced through two afore-mentioned edited volumes of Tullock (1972, 1974 a). Two recent relevant edited volumes of Stringham (2005, 2007) which include a republication of some seminal papers in this field are valuable additions to this trend of thought. Unless anarchy is understood as chaos and mayhem, it can be conceived of a society without a state but not without rules (Coyne, 2005). The main issue is then whether an "ordered anarchy" (i.e. a social order without a state) is possible. Although earlier criticisms of anarchy (Tullock, 1972, 1974 a; Nozick, 1974) are almost unanimous that government is at least inevitable even if unnecessary, many libertarian anarchists suggest other alternatives. As Moss (1974) correctly underlines, an "ordered anarchy" entails not only a pure market economy but also a stateless communistic society. Rothbard (1973, 1977) and many other free market economists are advocates of a recent version of "private-property" anarchism. Polanyi (1944), Leeson and Stringham (2007) provide examples of archaic stateless societies based on "reciprocity" or primitive communism. The importance of these two major forms of "ordered anarchy" notwithstanding, my contribution consists of developing an analysis of a third type of "ordered anarchy" which I name destructive coordination. In this case, the state failure or sovereignty crisis is more important than a lack of state. Parallel institutions and contradictory orders (Vahabi 2006 a,b) may lead to an ordered anarchy where aggressive behaviour and the use of coercive means constitute the "rule of the game". The focus of Public Choice literature is not such kind of "ordered anarchy", and a few contributions that deal with the problem of "cooperation to

coerce" result in the reemergence of government (Tullock, [1972] 2005; Gunning, [1972] 2005; Hogarty, 2005; Cowen and Sutter, 2007; Rutten, 2007; Holcombe, 2007). More importantly, in exceptional cases where such kind of order is considered to be viable (Friedman, 2007), state monopoly is opposed to a market private system of "multiple police". In other words, "ordered anarchy" in the framework of Public Choice School is reduced to a pure market system that may also include (or exclude) coercion. Our contention is that destructive coordination should not be confused with market, bureaucratic or ethical coordination.

In the following parts, we will first study destructive coordination as a particular form of *social* integration through two simple illustrations. Then we will focus on the *economic* dimension of this coordination as an appropriative allocation mechanism.

2. Destructive coordination: two simple illustrations

A simple illustration of destructive coordination in comparison with other modes of coordination is provided by the way car drivers may coordinate with each other in traffic circles.

2-1. Traffic circles

Different modes of coordination allocate the right to use the road in different manners. *Market coordination*: special tolls may be set to obtain the permission to drive in districts leading to such traffic circles during the day (Teheran's 'traffic project' started in 1992 is a good example). *Bureaucratic coordination*: several traffic lights are installed on the circle to monitor and enforce the priority of drivers according to official prescriptions (*Place d'Italie* in Paris is a salient example). *Ethical coordination*: the voluntary attention and compliance of drivers towards other drivers renders such coordination possible (the state of social brotherhood during the 1979 revolution in Iran contributed to such instances of coordination

even in the absence of police monitoring and official prescriptions). *Destructive coordination*: some drivers adopt an aggressive way of driving (by rushing into others and 'pushing' them out of way, honking, and nipping in and out of traffic) to force others to give them the lead. In such cases, they wilfully infringe upon the rights of others or 'impose' their proper rights which otherwise would be violated despite the fact that there exists a 'code' which clearly defines the rules and priorities.

It is noteworthy that in a destructive coordination, even the drivers who have the priority must behave aggressively to impose their rights. Hence, to drive aggressively is not just an attitude chosen by 'bad' drivers who do not have the priority. Every driver, irrespective of being 'bad' or 'good' should adopt an aggressive behaviour to guarantee his/her rights or to infringe the rights of others.

Aggressive driving increases the probability of accidents. However, borrowing the terminology of the 'incomplete contract' literature (Hart, 1995), the problem is that although the offence of the transgressor is 'observable', it cannot easily be 'verified' by the third party (i.e. the insurer or the court) given the multiple entry/exit situation in a complex traffic circle such as *Place Charles de Gaulle* in Paris. If both parties are insured, if there is no severe corporal damage, and if the accident is not so costly as to require a detailed damage survey that may identify the offender, the insurance companies may apply systematically the rule of 50/50 to share the damage costs of the accident due to the *non verifiability* problem. The systematic application of the 50/50 rule may encourage aggressive driving. Suppose that there are two types of drivers: aggressive and non aggressive. If the probability of an accident is θ, then the benefit of an aggressive driver who can overtake others, and shorten his waiting time in the traffic circle, in terms of the price of time saved would be $B(1 - \theta)$, and the cost in terms of time spent in the traffic and the car insurance surcharge would be $C\theta$.

The net benefit of an aggressive strategy, then would be: B (1 – θ) - C θ, whereas a non aggressive driver will save C θ if there is no accident. The real issue is thus to shorten the waiting time in a traffic circle and "grab" the price of time saved by adopting an aggressive behaviour. The game between these two categories of drivers is a special case of the 'Chicken or Hawk-Dove game' of Maynard Smith (1982)[iv]. It is a non cooperative and non repeated game, with no dominant equilibrium strategy if it is played simultaneously. A simple illustration of the game with the following matrix of pay-offs between two players A_1 and A_2 with two possible pure strategies, namely A (aggressive strategy) and P (pacifist strategy) clarifies the point.

Figure 1. Traffic circle game

		Player A_1	
	Strategy	A	P
	A	-1, -1	**4, 0**
Player A_2	P	**0, 4**	1, 1

Mainstream game theory would distinguish three Nash equilibria here: (Aggressive, Pacifist), (Pacifist, Aggressive) and a mixed strategy Nash equilibrium where each player plays aggressively with a probability of 1/3 (Hargreaves Heap and Varoufakis, 1995, p. 198). (**4, 0**) and (**0, 4**) are two *pure* strategy Nash equilibria[v], but they have the defect of asymmetry. How can the players know which equilibrium is the one that will be played out? Even if they could have communicated before the game started, it would not be clear how they could obtain an asymmetrical result. The game contains a mixture of conflict and cooperation. Both parties will benefit if they can avoid simultaneous aggressive behaviour (with -1, -1 pay-offs), so there are benefits from some sort of cooperation. On the other hand, there are also conflictual interests because depending on how the conflict is avoided, the benefits of cooperation will be differently distributed between the two players. If for example, the conflict is avoided because

A_2 adopts a 'pacifist' strategy while A_1 chooses an 'aggressive' strategy, then A_1 will have 4 benefits and A_2 zero and vice-versa. The game is accordingly called *anti-coordination*. This well-known game provides a good illustration for disorder or anarchy. But under what conditions could we have an "ordered anarchy"? Inspired by the Anarchy Research Program of the Public Choice, Osborne (2005) argues that individuals can adopt a strategy known as "contingent cooperation". Osborne's model postulates that even in one-shot games, individuals can communicate before interacting, thereby enabling them to detect signals about the likelihood that the other party will cooperate. Undoubtedly, the problem of multiple equilibria in *anti-coordination* game will be solved if the players play *sequentially*. Every player has an advantage to move *first*, since the first mover can adopt an aggressive strategy and force the other to adopt a pacifist strategy (4, 0; or 0, 4) so that a situation of (-1, -1) be avoided. Plainly, it implies that drivers entering in a traffic circle from the right hand side (in the case of a right hand side priority rule which exists in most countries like France) should choose an aggressive strategy to 'impose' their rights. This result holds true for every incumbent driver who has the possibility to move first. Drawing upon this basic textbook game, I would like to emphasize the conditions under which even a one-shot *anti-coordination* game finds its equilibrium solutions. Put differently, our endeavor is to show how coercion and aggressive behavior can lead to a particular order or to an "ordered anarchy".

Note that this type of coordination is at work due to the *third party failure* (the insurance company or the court) to implement the rules. For example, when the insurance companies are not legally bound to reimburse the insured in a short period after the accident, they are not motivated to incur the additional costs of a detailed damage survey necessary to identify the driver at fault. In France, the Badinter Law and Conventions decreed in July 1985 (Chabas, 1995) radically modified the situation by binding insurance companies to reimburse the

victims of car accidents within a six-month period delay. A more detailed investigation by insurance companies in case of serious car accidents limits the adoption of aggressive strategy and weakens destructive coordination. Thus the law provides a *credible commitment* to *protect* 'good' or pacifist drivers against aggressive drivers by having insurance companies that can reprimand them through monetary sanctions.

The traffic circle example casts light on destructive coordination in a one shot or non repeated case. Our second example illustrates the logic of destructive coordination in a repeated game.

2-2. Prison

Different modes of coordination can be distinguished in different types of prisons. *Bureaucratic coordination* is common in military prisons for *national* soldiers and officers at fault[vi]. In this type of prison, the relationships among prisoners and between prisoners and guards are regulated by official prescriptions and strict administrative regulations. *Ethical coordination* usually prevails in political prisons under authoritarian or totalitarian regimes. Political prisoners support and take care of each other especially the weaker ones (those who are ill or recently and severely tortured receive special treatment and attention from other prisoners in the cell). Prisoners act collectively to display their distinct identity as 'political' opponents of the regime and boost their morale against the prison authorities who continuously try to crush their resistance. *Market coordination* is used in case of affluent or renowned prisoners (for instance, Paris Hilton in her recent short captivity) in ordinary or criminal prisons who can bargain special treatment and protection with guardians against monetary reward. Privatisation of prisons or their management can strengthen such kind of coordination. *Destructive coordination* is the dominant form of coordination in many criminal public prisons throughout the world. A more general philosophical reflection concerning the 'prison' as the continuation of the medieval dungeon for 'surveillance and punishment' (Foucault, 1975; Deleuze, 1996) reveals the destructive nature of the institution in itself[vii].

Putting human beings in a cage like animals (Netz, 2004) and destroying their vital space of life leads to adverse consequences such as: reproduction of criminal activities, high rate of suicide, mental disease, drug addiction, sexual assault, and sexually transmitted infections (STIs) (Coid *et al.*, 2002; Stewart, 2007).

These destructive dimensions of the prison as an institution notwithstanding, I refer to destructive coordination in a more specific way. It is based on the predominance of violence in the relationship between guards and prisoners as well as among prisoners themselves[viii]. Accordingly, the 'law of the jungle' reigns among the various gangs of prisoners, particularly when governors and guards, far from protecting prisoners, mistreat them. While the practices employed in Guantanamo would have been illegal on US soil, they were authorized by an appeal to a 'state of emergency' (Agamben, 1998), yet the results of detailed investigations about prisons in the United States and France revealed that "every prison has its own Guantanamo" (Mouloud, 2006). Nevertheless, the 'jungle' has its own 'codes and laws', and one of its inviolable article is what we also find among the Mafia: "It is a fundamental rule for every man of honour never to report a theft or crime to the police" (Gambetta, 1993, p. 119). As Taylor (2003) reports regarding rape victims in English prisons, many suffer in silence because being labelled a 'grass' guarantees hostility or violence from other prisoners; and some may consider suicide to be the only option.

An overcrowded and impoverished prison environment with severe sexual deprivation and frustration is a fertile soil for harsh territorial conflicts. Furthermore, a recent detailed study about the experience of imprisonment in various countries has found that the number of prison cells has increased, rather than decreased after major political changes such as the collapse of the Soviet bloc, the Apartheid system, or the Haiti dictatorship: "All international studies have clearly shown that the construction of new establishments, has increased, rather than diminished demand for incarceration" (Artières, Lascoumes and Salle, 2004, p. 35, my

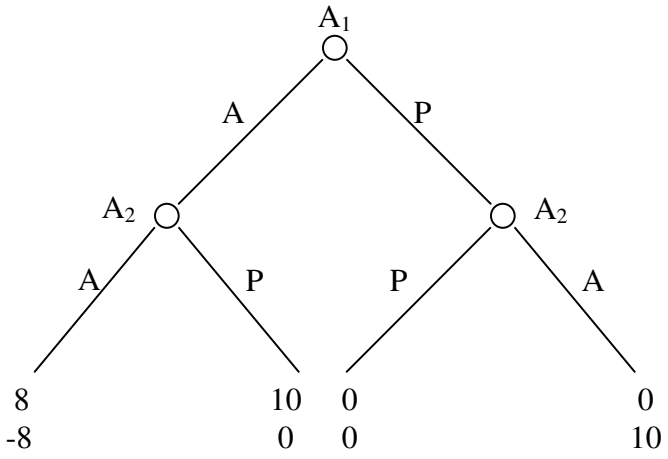
translation). In the absence of 'public' protection, aggressive behaviour permeates all the relationships among prisoners. Even when an inmate is confronted with an aggressive and, stronger prisoner, it is advisable to act aggressively and accept the cost of giving a 'signal' of not being a coward. Everyone will better seek 'private' protection by joining a 'gang'-- and pay for it in terms of sexual intercourse, drug traffics, etc. Even if an inmate is not personally capable of reacting aggressively to aggression, his/her gang will respond in kind. Retaliation emerges, thus, as a way to regulate conflicts. Contrary to the traffic circle example, in a repeated game situation such as a criminal prison, having the initiative to *move first* is not sufficient to determine the equilibrium position, since *retaliation* is possible (Kreps, 1990). In this case, costly 'signalling' and creating the 'reputation' of being a 'tough guy' is a prerequisite of rendering one's threat credible. The length of detention is a key factor for revealing the value of the 'signal' since those approaching the end of their sentence have a strong tendency to avoid conflicts. Furthermore, the type of crime for which the prisoner is detained and the number of incarcerations are other important criteria on which the hierarchy in the prison is established. "If a hierarchy exists in UK prisons, it may be linked to *length of sentence* (long and short term or remand), to the *age* (old and young) of the predominantly male population, and *type of offence* (sex, drugs, or violence-related). The older long-term or life prisoners (including sex offenders) are likely to have power and influence within the prison system, whereas the younger short-term or remand prisoners with drug problems or convicted of non violent offences are likely to be more vulnerable and compliant, especially those who are in the prison for the first time or who will be found innocent." (Stewart, 2007, p. 53).

Providing three "Cases in Anarchy", Hogarthy (2005) discusses a prisoner-of-war camp (Andersonville) during the American Civil War. In his example, the prisoners do not act cooperatively, and are engaged in aggressive behaviour. He identifies an initial coalition of

"raiders" and a second one of "regulators" who defend themselves against the raiders. The benefits of predatory or "grabbing" activity in the prison are once again a major issue for the raiders. Nevertheless, their pleasure is more than pure grabbing, but rather gaining a dominant position: "In the outer world, they had been insignificant, eternally existing in dread of discipline. Here the only discipline consisted of that which they administered" (Hogarthy, 2005, p. 106). Of course, in Hogarthy's illustration, the temporary domination of the raiders is overcome with the aid of the "pre-existing" provisional government. In the following discussion, I try to analyze a situation where an "ordered anarchy" can emerge in the presence of the state failure to guarantee public protection.

The territorial conflict between prisoners in terms of game theory should be represented in an extensive form due to the dynamic character of the game. If A_1 and A_2 are respectively the stronger and the weaker prisoners, then their strategies (aggressive or pacifist) and the pay-offs related to them are as follows:

Figure 2. Territorial conflict in prison



The upper number stands for the benefits of the stronger prisoner (A_1), and the lower one represents the benefits of the weaker one (A_2). If A_1 adopts an aggressive strategy, A_2 may

adopt either an aggressive strategy or a pacifist strategy. Although an aggressive strategy is costly for A_2 (-8) compared to a pacifist strategy (0), A_2 should adopt an aggressive strategy to give a 'signal' that he is 'tough'. This will pay off in the long term, since A_2's credible commitment to retaliate persuades A_1 to adopt a pacifist strategy if A_1 anticipates that the outcome of a war of attrition will be mutually destructive. In such case, A_2 will prefer to behave pacifically despite the fact that otherwise he will gain more (10 instead of zero), since he will be menaced by further retaliation of A_1 that will cost him (-8) if he sticks to his reputation as 'tough'. Signalling to build a 'tough' reputation will transform, step by step, the initial aggression/aggression situation with pay-offs (8, -8) to a final pacifist/pacifist situation with pay-offs (0, 0).

All prisoners do not necessarily serve a life time sentence, and it is realistic to suppose that the dynamic game has a finite horizon with a last period of exit for the prisoners. Approaching the liberation date, prisoners have a strong stake to avoid conflict so that their detention will not be prolonged. The expected pay-offs of a mixed strategy of aggression and non aggression compared to a pure pacifist strategy can be formulated as follows:

$$\textit{Expected benefits of a mixed strategy} = \int_0^T Ae^{-rt}dt + \int_T^t Pe^{-st}dt \quad (1)$$

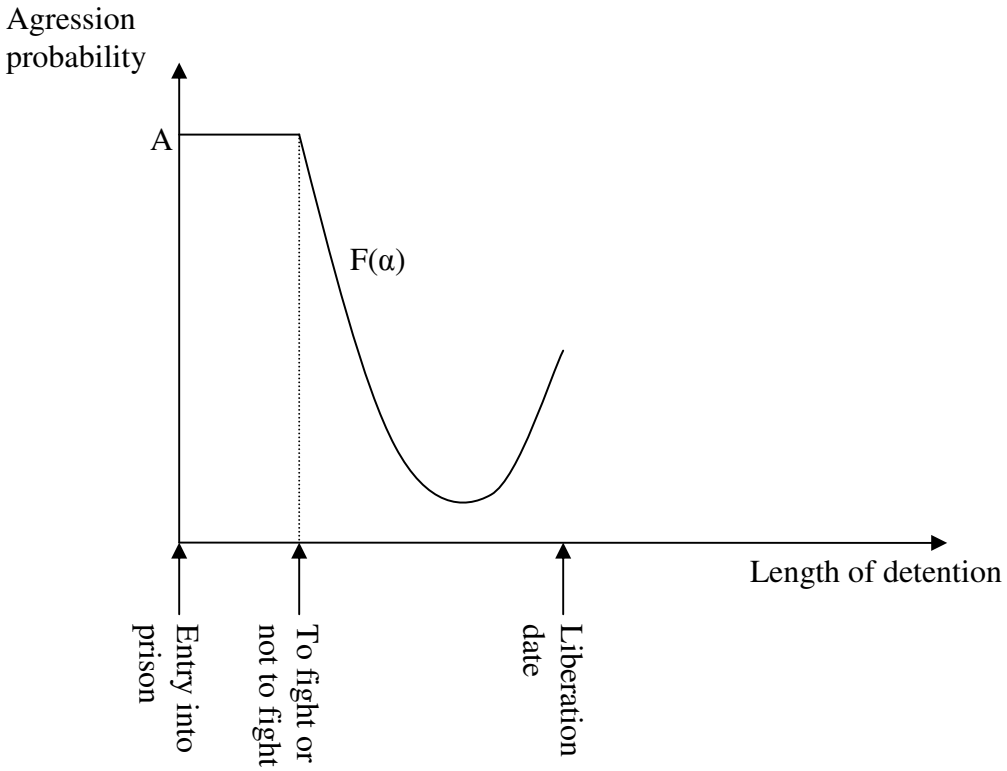
$$\textit{Expected benefits of a pacifist strategy} = \int_0^t Pe^{-rt}dt \quad (2)$$

(A) stands for an aggressive behaviour and (P) stands for a pacifist behaviour. (T) is the moment when the weaker party stops fighting and looses its reputation to reply tit for tat. If (α) denotes the signal of the initial combat, then in a two period game, the expected benefits of being aggressive would be

$$\alpha\ 8 + (1 - \alpha)\ 10 > \alpha\ 0 + (1 - \alpha)\ 0, \text{ and thus } \alpha < 5 \quad (3)$$

It can be assumed that the probability of being aggressed (α) evolves with the length of detention. At the beginning of detention, the probability of aggression is at its maximum, since the newcomer is not part of a gang and his combat value is not tested. Then, given that prisoner as part of a gang or individually tries to build a reputation of a 'tough guy', he (or his gang) will respond to aggression with aggression even if it costs him (or his gang) highly. The reputation effect weakens the probability of aggression by the incumbent prisoners. Consequently, the probability of aggression will decrease up to a point where the date of liberation approaches. In this last period, the possibility of aggression will increase once again but not as high as the initial period, since the previous combats and the length of detention provides a signal that one cannot mess about with the 'tough guy' over a certain tolerance threshold. These three phases are illustrated in the following graphic.

Figure 3. The probability of aggression and imprisonment



The peace between prisoners is then nothing but a 'balance of terror'. The dynamic of this extensive game is not like the typical Rosenthal's (1981) centipede game[ix]. It is a *sequential equilibrium* in which every player adopts his strategy on the basis of a *belief* he may have about the way the other player may behave with a certain probability. Thus, it includes the possibility that each player's information set (for instance, A_1's) is *out-of-equilibrium* or *off the play* given the way the belief is formed. The possibility of choosing an out-of-equilibrium move by a player implies the fragility of equilibrium, and can be represented by a particular type of sequential game called 'a trembling-hand perfect equilibrium' (Kreps, 1990, section 12.7). This type of sequential game captures the reputation effect. The depiction of the dynamic of the 'balance of terror' within the prison in terms of trembling-hand equilibrium highlights the fragile character of a non aggressive situation.

Note that in this example, destructive coordination is closely linked to the nature of prison as a social institution that destroys the vital space of prisoners. Apart from this fundamental institutional failure, the lack of 'public' *protection* and the need for 'private' *protection* nurture destructive coordination. The perpetuation of this type of coordination is thus related to the *institutional vacuum* or sovereignty crisis within the prisons that justifies the existence of gangs and guarantees compliance to the 'parallel' codes of prisoners.

3. Destructive coordination and appropriation

How are resources (goods and services) and human efforts allocated in destructive coordination compared to other types of coordination? This is, from an economic point of view, the thrust of the problem. To answer this question, Pareto's distinction between two different 'allocation mechanisms'[x], namely the productive and the appropriative is useful: "The efforts of men are utilized in two different ways: they are directed to the *production or transformation* of economic goods, or else to the *appropriation* of goods produced by others" (Pareto, [1927] 1971, p. 341). Borrowing Pareto's distinction, the allocation mechanism in a

destructive coordination should be characterized as 'appropriative'. Appropriation includes all the different types of predatory methods such as expropriation, confiscation, piracy, grabbing, etc.

In the preceding two examples, we highlighted the importance of grabbing activity. Aggressive behavior in the traffic circle case guarantees the shortening of the waiting time or the grabbing of the price of time saved. In the prison example, raiders' predatory activity is not only paid off by significant material benefits but also by gaining a dominant position. In both cases, social integration through coercion allocates resources in an appropriative way. Although pure *economic* or appropriative dimension of destructive coordination has been stressed in the previous examples, our focus was mainly on the specific *social* coordination as an "ordered anarchy". Since property rights are part of the law and order package, an inquiry about the type of social order precedes the analysis of property rights and economic allocation. The latter shall now be developed.

A simple illustration regarding the way destructive coordination allocates a given resource in comparison with other types of coordination will clarify this point.

3-1. Biopiracy: *res nullius* and privatization

Consider the example of a 'contested' or an 'invaluable good' (Radin, 1996; Arrow, 1997), namely blood. Although the practice of blood transfusion started five hundred years ago, it was not until the twentieth century that blood became a widely-sold body 'product'. Blood was the first human body 'part' to be commercialized. In fact, there are different allocation mechanisms in the case of blood.

Ethical coordination: Richard Titmuss (1971) strongly advocated an entirely voluntary system for blood donations, excluding monetary rewards for the donors. In his opinion, blood should be a *gift*, *not* a *commodity* and the act of donation should confirm a citizen's commitment to the principle of reciprocity. "Short of examining …the institution of slavery –

of men and women as market commodities – blood as a living tissue may now constitute in Western societies one of the ultimate tests of where the 'social' begins and the 'economic' ends." (Titmuss, 1971, p. 158). The United Kingdom system of supplying the blood for transfusion on the basis of a voluntary and unpaid collection was his model. This model was a reproduction of the first modern blood bank at Cook County Hospital in Chicago in 1927, invented by Oswald Hope Robertson, which was inspired by the experience of battlefield transfusion (Hess and Schmidt, 2000).

Market coordination was introduced in 1955 and then legalized in the United States in 1966 after a court ruling which ordered that blood was a product like any other. The dispute had started when two commercial blood banks in Kansas City, Missouri, had charged a non profit community blood bank with conspiracy "to hamper, restrict and restrain the sale and distribution of blood in interstate commerce" (Cited in Kimbrell, 1995, p. 134). It should be highlighted that the American system was not one of undiluted market coordination; rather it was a mixed system, comprising both commercial and non commercial blood banks, and utilizing various modes of payment. According to Titmuss' estimates at the time, about one third of the U.S. supply came from paid blood donors, most of them poor, homeless, often alcoholics or drug addicts. In West Germany more than one third of the blood was coming from paid blood donors. In Japan virtually all the blood was distributed commercially because the giving of blood was shunned as an infringement of the personal sphere, and all blood was imported.

Bureaucratic coordination: in this system the blood allocation is managed by the state, rather than by commercial blood banks. Here the donors were sometimes paid. Two salient but different examples are: i) the former USSR where approximately 50 percent of the blood collected this way, and donors fetched a high monetary reward; and ii) Sweden, where all blood was (and is) gathered and paid for by the state, rather than by commercial blood banks.

An administrative coordination without any payment to the donor, and even without the donor's consent has recently been made possible through a new definition of death. Following the recommendation of the Harvard Medical School committee in 1968, the American Medical Association, the American Bar Association, and a White House commission all endorsed, in 1981, that death was the moment when brain activity rather than heart and lung function stopped permanently. Within a short time, most states had passed legislation in the same vein. Given new technologies in artificial circulation and respiration, patients who were, according to this new definition, "dead" could be kept functioning for months, even years. These 'neomorts' or 'living cadavers' could then be used as 'storage systems' or 'research tools' for testing drugs and new medical procedures, or for providing scarce organs and blood. Hospitals could allocate the organs from the 'neomorts' according to a waiting list to patients without payment. If such harvested organs or blood is provided for free, this would be an instance of bureaucratic or administrative allocation. If, on the other hand, harvesting was done without compensation, and the crop sold in the market for organs and blood, this would be *destructive coordination*.

Count Dracula (Stoker, [1897] 1997) and vampires illustrate nicely a kind of *destructive coordination* of blood. The Transylvanian Count sucks 'unpaid' and 'non-donated' blood. His action is comparable to piracy or appropriation of blood. The same type of allocation can be found through harvesting the 'dead' in developed countries by tightened definition of death, or through biopiracy in under-developed countries. We have already mentioned the importance of a change in the definition of death. The appropriation of 'neomorts' blood without donors' consent is related to the fact that there is no authority or defined property rights over a cadaver. We are confronted with a *non property* or *res nullius* situation. To rectify this *institutional vacuum* that provides the opportunity for appropriation, people in

developed countries are informed that in the absence of a clear disapproval of organs donation during their life time, their cadaver may be used for clinical purposes.

Biopiracy provides another instance for destructive coordination in blood allocation. The term 'biopiracy' was coined in the early 1990s by Pat Mooney, Executive Director of ETC Group, a Canadian NGO formerly known as the Rural Advancement Foundation International (RAFI), "to cover the unauthorized and uncompensated expropriation of traditional knowledge. This includes the patenting of seeds and trees, healing herbs, and the selling of human body tissue." (Tedlock, 2006, p. 257). Many other definitions and interpretations have been ascribed to the concept[xi] (see Hamilton, 2006, p. 159) among which the one suggested by Shiva (2001) is particularly relevant. For it calls into question the legitimacy of 'intellectual property rights' (IPR) as a way to 'plunder' rather than 'protect' biological resources and products that have been used over centuries in non-industrialized cultures. In fact, in 1994, the WTO developed a global patent system based on the US legal concept of intellectual property rights. Under this new legal regime, known as the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPS), individuals and groups who claim to have 'discovered' or 'invented' something are given a monopoly over the commercial development of their innovation over a limited time period (usually 20 years). Anything that is *not protected by intellectual property rights* is considered to be in "the public domain". Many examples of biopiracy have been cited. The following are a few of the well known cases: the 'seed wars' or the 'international controversy over the ownership of germplasm and other related issues' of the 1980s (Juma, 1989), the patenting of living organisms (Bright, 1994, Kimbrell, 1995), the W.R. Grace patent on a fungicide derived from the seeds of the Neem tree – *Azadirachtin Indica*[xii] (Hamilton, 2006, pp. 164-168), the launch of a new strain of 'trailing' Busy Lizzie by the multinational biotech giant Syngenta (Barnett, 2006), the

possible extinction of the Rosewood tree and the production of Chanel No. 5 (Amazon News, 2002). Biopiracy also includes blood patenting and several cases have been reported.

The first case was reported in August 1993 by the RAFI regarding the US government's attempt to patent a cell line derived from a 26-year-old Guyami woman (western Panama). The cell line, a type of culture that can be maintained indefinitely, came from a blood sample obtained by a researcher from the US National Institutes of Health in 1990. The application claimed that the cell might prove useful for the treatment of the Human T-lymphotropic virus, or HTLV, which is associated with a form of leukemia and a degenerative nerve disease. Despite the intervention of the President of the Guyami General Congress who asked the US to withdraw its claim and repatriate the cell, the GATT did not forbid the patenting of human material. Facing strong opposition by a growing number of NGOs, the US finally dropped its claim in November 1994 (Bright, 1994). But this was not the end of the story. In January 1994, two similar cases were brought to light by a European researcher. The Swiss NGO activist Miges Baumann discovered that the US National Institutes of Health had filed 'invention' applications on cell lines derived from the Hagahai people[xiii] and the Solomon Islanders. These cells might also be useful in curing HTLV. The story of this so-called 'invention' of the Hagahai cell line could be traced back to the early 1990s when the Genetic Institute of the University of Javeriana in Colombia gathered tissue samples from hundreds of Columbian indigenous people and sent 2305 blood samples to the US National Institutes of Health. The US National Institutes of Health then patented the cell in March 1995. However, it abandoned the patent under the pressure of public outcry in late 1996. Of course, even today the Hagahai cell line is available to the scientific public for $290 per sample at the American Type Culture Collection (ATCC). Another case of biopiracy in August 1996 concerned the doctor accompanying a US research team in Brazil who asked hunters from the Karitiana tribe for samples of their blood under false pretexts. When questioned about the motivation for

taking samples, the doctor denied any intention of commercializing the blood. However, later it was revealed that the blood was commercialized and sold $500 per sample on the internet by Coriell Cell Repositories, a not-for-profit scientific institution, in Camden, New Jersey (Tedlock, 2006, p. 257).

Patenting blood, like other forms of biopiracy such as expropriation of traditional knowledge of indigenous people, patenting of seeds, healing herbs, and selling of human body tissue, *institutionalizes private property through the abolition of property rights*. The origin of private property is not frugality, 'invention' or free exchange, but appropriation through colonialism, pirating, and other violent means. This was true during the so-called 'primitive accumulation of capital' (Marx, [1867] 1978, Vol. 1, chapter 31), and it is also true in the age of mature capitalism. Private property should begin with a state of no property (*res nullius*)[xiv] as if one finds or 'discovers' something that has never been lost[xv], or has never belonged to anyone so that it becomes 'appropriable'. Patenting life and plants assumes such a state of 'free access' or *res nullius*. As noted earlier, according to the TRIPS legislation, anything that is *not protected* by intellectual property rights is considered to be in the 'public domain', which means it can be exploited by anyone without any concern for the wishes of the original (knowledge) holders and without sharing any monetary or non-monetary rewards with them. The inclusion of Intellectual Property Rights (IPR) into the text of the WTO agreements was a direct result of pressure from US industries dependent on IPR, not least of which were the pharmaceutical and agro-chemical companies (Correa, 2000). Bromley (1992) rightly notes that 'public domain' is not an appropriate concept for describing an 'open access regime' in which there is no property (*res nullius*). "The essence of any property regime is an authority system that can assure that the expectations of rights holders are met…When the authority system breaks down – for whatever reason – then common property (*res communes*)

degenerates into open access (*res nullius*)." (Ibid., p. 12). Open access results from the absence – or the breakdown – of an authority system whose very purpose is to assure compliance with a set of behavioral conditions with respect to the natural resources or human life. To address this problem, the TRIPS legislation requires *each nation state to create patents for all life forms in its territory*.

Property is inseparable from sovereignty. The separation of property rights and sovereignty muddles the concept of property rights. The reason is that among different types of property rights, the one which cannot be contracted away is *abusus*, while both *usus* and *fructus* can be contracted without causing any damage to the very right of ownership. Thence *the ultimate boundary of ownership is the right to destroy*. Ownership also starts by the sovereign power that protects and hence could destroy. The institutionalisation of private property requires the exclusion or expropriation of others from the right to control. Blood patenting is a pre-requisite of commercialising cell lines. Thus, destructive coordination of blood allocation through cell line patenting or dead 'harvest' is a *transitional phase* to build the necessary institutional arrangements for private property and market allocation.

3-2. Destructive coordination and disarticulation problem

Social order is too complex to be represented by a single 'idealized' coordination mechanism. It is rather the outcome of a particular constellation of different modes of coordination. The rivalrous or complementary relationships, between different types of coordination is thus the major issue of every social order. To illustrate the point, Schlicht (1998)[xvi] cites Titmuss' blood allocation example.

Titmuss (1971) stresses the rival uses of exchange and gift in blood donation. Many persons donate blood voluntarily, but cease to do so if a commercialized system is introduced whereby donors receive money for their donation. But why is this so, asks Arrow (1972) in his paper about Titmuss' book, and finds no answer to his question: "Why should it be that the creation

of a market for blood would decrease the altruism embodied in giving blood? I do not find any clear answer in Titmuss." (1972, p. 351). Arrow is more in favour of a 'mixed system' in blood allocation such as the type developed in the US, and maintains his position twenty five years later when he reviews Radin's book (Arrow, 1997, p. 762). Schlicht, however, finds an answer to this question: "Without a blood market, the individual donor will donate out of moral obligation ('If nobody donates, there would be no blood to help the injured'). With a market, this argument loses force, *because the price mechanism now provides another means to secure blood supply* ('If there is insufficient blood supply, the price must be raised'). Without a market, blood donations appear indispensable. The introduction of a blood market creates an improved possibility for obtaining blood and thereby destroys the moral obligation to make donations. Duty is substituted by money in a lumpy way." (Schlicht, 1998, p. 228).

In Schlicht's answer, the dilemma '*gift* versus *exchange*' is explained in terms of an institutional arrangement (price mechanism) at work. If there is a market, then the price mechanism takes care of a shortage in 'blood supply' by raising the price level. Nevertheless, the price mechanism is not sufficient to resolve the problem of 'quality', since adverse selection due to asymmetrical information between buyers and sellers is present in the blood market. In fact, Titmuss (1971) emphasizes several types of failure with regard to the market allocation of blood among which the 'bad' quality of blood is noteworthy. The blood sold by paid donors is drawn almost exclusively from the neediest layers of the population including the sick, and addicts. Accordingly, a major risk of infection through transfusion becomes imminent. Hence, the market failure requires a complementary mechanism such as *reputation* or special *regulation* to guarantee the quality of blood collected by commercial blood banks. It is not surprising then that since the Federal Trade commission (FTC) decision in 1966 concerning the classification of blood as a 'commodity', the use of paid donors for whole

blood used in transfusions declined in the US "from about 80 per cent of all transfused blood in 1966 to less than one per cent in 1991, due to ethical concerns about buying and selling and in part to fears that blood from paid donors is a potential source of infection." (Kimbrell, 1995, p. 135).

The *ethical coordination* of blood allocation is not exposed to the infection risk, since unpaid donations come from all layers of the population, and the voluntary nature of procurement precludes untruthfulness with regard to the quality of blood. But why, as Schlicht suggests, does an improvement in obtaining blood through market allocation destroy the moral obligation? The reason should be sought in the *pervasiveness* of market relationships. In the presence of commercialized blood, free blood donations also become 'commodity' to some extent, since it can be sold at market prices. One simple illustration is blood products. In 1991, over 13 million plasma extraction procedures were performed in the US. Over 95 per cent of the donors were paid. Voluntary donor centres like the Red Cross provided another two million litres of plasma, collected for free from donors "but *often sold at market prices* in the plasma products market" (Kimbrell, Ibid.). But why should one provide a 'gift' that would be sold at market price? In other words, the reciprocity logic becomes subordinated to the market logic. The organic combination of different modes of coordination leads to the *domination* of one of them. The pervasiveness of the market coordination subordinates the logic of reciprocity by reducing its proportions and feasibility, and by destroying its particular institutional arrangement.

At a psychological and cognitive level, Schlicht notes the importance of 'the clarity principle': "If there are several reasons for doing something, this creates 'overjustification'; one possible motive will be selected, and all others will be discounted." (Schlicht, 1998, p. 228). This *psychological* explanation at an individual level should be completed by an *institutional* analysis at an aggregate level. The integrative effect of every type of

coordination is conditioned by the presence of definite institutional arrangements, such as symmetrical organizations (reciprocity), central points (redistribution), and market systems (exchange). The articulation among different forms of coordination requires the domination of one of them due to the *coherence* of institutional arrangement that supports a particular type of coordination.

But what happens in the case of an *institutional vacuum*? To continue with the example of blood allocation, what happens in the case of 'blood patenting'? We find no answer to this question in Titmuss, Arrow, or Schlicht, since they do not discuss biopiracy. To address this problem, the Convention on Biological Diversity (CBD) recognizes that genetic resources are *nationally sovereign* resources. When genetic resources become conceived of as 'sovereign resources', it becomes possible to see them as something other than 'common heritage' or in IPR terminology, as part of the 'public domain' from which we can all benefit for free. But as already mentioned, this means that the TRIPS legislation requires each nation state to create patents for all life forms found in its territory. Of course, one can imagine the implication of this legislation for many African countries which do not even have sufficient financial funds to hire lawyers or juridical experts to represent them in the WTO!

As argued before, biopiracy is a form of destructive coordination that allocates resources and human efforts through appropriation. Destructive coordination is the emblematic type of coordination that usually prevails under conditions of institutional vacuum, as illustrated by the examples given in this paper. By 'institutional vacuum', we do not mean a situation devoid of institutions or amorphous institutions. It refers to a transitional period where the old institutions and organisations of coordination cease to function, but the requisite for new systems of coordinative institutions have still not been developed sufficiently. An institutional vacuum is generally linked to sovereignty crisis, or generalised parallel institutions where *protection* of one's life and entitlements is often more important than *production or*

transaction. It may be conceived as a state where the rules confined to pockets of Guantanamo's in some prisons govern an entire region or society. The post-revolutionary Iran has been witnessing the dominance of destructive coordination with *Bonyads* as its particular economic institution. This type of coordination at a macro level can be called 'the Iranian Disease', a pandemic more dangerous than 'the Dutch Disease' for economic growth (see Vahabi 2006a, b). Protection costs rather than transaction costs become accordingly the determining factor in the allocation of resources and human efforts.

Bargaining, reciprocity, and third party intervention (state or some other form of central power) would then assume a secondary role compared to bi-party conflictual relationships. Appropriation is a *transitional* phase, giving rise to more tightly defined definite rights (not only property rights, also communal rights - the entire system of rights may crystallize). A transitional phase may not be necessarily 'transitory', or short. It may stretch over centuries as in the case of 'primitive accumulation of capital'. Under such circumstances, there is no *dominant* mode of coordination. In this sense, we may even speak of *disarticulation*. However, disarticulation does not necessarily imply chaos. A special kind of order or "ordered anarchy" may be maintained through intimidation, threat, and aggressive means that prepare the way for new institutional arrangements and corresponding constellation of property rights.

Conclusion

Four results can be drawn from this study. The *first* is that besides market, bureaucratic and ethical coordination, there exists another type of coordination: destructive coordination. As my illustrations of traffic circles and prisons show, destructive coordination is supported by an institutional vacuum, and is regulated through intimidation, threat, and the adoption of aggressive attitudes or means. Two general conditions are required for the existence of destructive coordination: i) there should be a game that contains a mixture of conflict and

cooperation, where adversaries should also behave as partners. In both examples, destructive coordination is not the outcome of a zero sum game; ii) there should be a third party failure (the state or the insurer), and hence a failure of external enforcement. In the traffic circles case, the non verifiability condition by the insurer or the state prompted the failure. In the prison case, the absence of public protection entailed destructive coordination. Yet an order or equilibrium was established through aggression (non institutionalised violence or coercion) that can be depicted as "ordered anarchy".

The *second* result is that the aggressive behaviour is not the result of the players' wicked nature or motivation (good or evil). Players must necessarily adopt an aggressive behaviour--not only in order to infringe upon the rights of others but also to impose their own rights on others or to build a reputation for toughness. To put it differently, aggressiveness as behavioural regularity is derived from the rules of the game (or institutional arrangement) in case of destructive coordination.

The *third* result is that at an economic level, the proper allocation mechanism of destructive coordination is appropriation through piracy, confiscation, robbery, predation, etc. Destructive coordination is essential in the *abolition* as well as in the *emergence* of property rights due to its role in defining a*busus*. Private as well as state ownership assumes that property rights are institutionalized and are well defined so that the ultimate boundary of ownership, namely the right to destroy (*abusus*) is also legally clarified and enforced. But the primary role of destructive power in resource allocation implies extra legal, ambiguous, undefined, or non-institutionalized (or insufficiently institutionalized) property rights. Booties in warfare and looting, or confiscated properties in a revolution are what may be called 'indeterminate' properties. The essence of any property regime is an authority system that can assure that the expectations of rights holders are met. When the authority system breaks down – for whatever

reason – then common property (*res communes*) degenerates into open access (*res nullius*). Although they can be transformed into 'public', 'personal', 'private', 'combinatorial', or other types of property ownership, their initial status remains indeterminate. In 'indeterminate' properties, entitlements to property rights depend on the discretionary power of the coercive authority. The biopiracy example identifies the importance of destructive coordination as a *transitional* phase in the institutionalisation of definite property rights. Under destructive coordination, the question of sovereignty overwhelms the problem of property, and protection rather than production or transaction occupies the pride of place. This example highlights how *destructive coordination* (blood patenting) can transform into *market coordination* (blood commercialization) in the presence of the US liberal state and giant pharmaceutical multinationals.

Finally, the analysis of the articulation among different types of coordination leads us to grasp the domination of one type of coordination over the others. However, the institutional vacuum that is marked by disarticulation among different modes of coordination provides a fertile soil for the preponderance role of destructive coordination.

There are still several issues that require further investigation. For instance, if economic processes are regarded as a set of decision, information and motivation structures, then what are the peculiar features of these structures with regard to destructive coordination? The answer to this question should be the subject of future research.

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[i] Despite the similarity of these classifications with regard to the importance of institutional arrangements in coordinating economic activities, their differences in several essential respects should not be dismissed. Some of these differences have been discussed in Kornai (1984, p. 309; 1992, p. 96).

[ii] The movie "On the Waterfront" directed by Kazan nicely illustrates *destructive coordination* in the job market.

[iii] For a more systematic analysis of 'destructive power' and its different forms including threat power and coercive means, see Vahabi, 2004.

[iv] There are three basic types of games that have been extensively discussed in game theory, namely the *Chicken* or *hawk-dove*, *coordination* and the *prisoners' dilemma* games (Rasmusen, 1992; Hargreaves Heap and Varoufakis, 1995). The *Chicken* or *hawk-dove* game is also known as the *anti-coordination* game (Binmore, 1990).

[v] We can calculate the probability of adopting each strategy in the *mixed* strategy equilibrium by players in our example. In the mixed strategy equilibrium, A_2 must be indifferent between *Pacifist* (P) and *Aggressive* strategies (A). This requires that A_1's probability of *Aggressive* strategy, which we denote by ψ, be such that

$$\pi \text{ (Pacifist)} = (\psi) \,.\, (0) + (1 - \psi) \,.\, (1) = (\psi) \,.\, (-1) + (1 - \psi) \,.\, (4) = \pi \text{ (Aggressive)}$$

From this equation, we can conclude that $1 - \psi = 4 - 5\,\psi$, so $\psi = 0{,}75$. The Chicken game discussed in our example is simpler than the movie *Rebel Without A Cause*, in which the players race towards a cliff and the winner is the player who jumps out of his car last. The pure strategy space in the movie game is continuous and the pay-offs are discontinuous at the cliff's edge, which makes the game more difficult to analyse technically. Technical difficulties arise in some models with a continuum of actions and mixed strategies. Sometimes these difficulties can be avoided by clever modelling as in Fudenberg and Tirole's (1986) version with asymmetric information. As strategies, they specify the length of time firms would continue to *Stay* (instead of *Swerve*) given their beliefs about the type of the other player, in which case there is a pure strategy equilibrium. For an analysis of the Chicken game in the context of evolutionary game theory, see Larry Samuelson, 1997, pp. 104-105.

[vi] We are not referring here to the 'indefinite detention of *non citizens* suspected of terrorist activities' decreed by the Bush administration and practiced in Guantanamo and Abu Ghraib prisons after the attacks of 9/11 in the midst of what it perceived to be a 'state of exception' (see Agamben, 2005; Szurek, 2004).

[vii] Foucault (1975) documents the generalization of 'prison' as an institution all over the world since the eighteenth century, and underlines the relationship between politics and repressive technology.

[viii] There are also situations in which a mixture of different modes of coordination is at work. For example, when in the absence of a political prison, political prisoners as well as military convicts are kept in jail with

criminals under military supervision. Dostoyevsky's personal experience in the prison fortress at Omsk, Western Siberia, for a four-year term of penal servitude (1850-1854) for his part in the Petrashevist conspiracy is a good witness. The full horror of his experience of prison is given vivid utterance in his masterpiece, *The House of the Dead*, which is a good illustration of a mixture of different modes of coordination particularly that of destructive, ethical, and bureaucratic one.

[ix] The solution of such a dynamic game of complete and perfect information is given by backward induction (see Kreps, 1991, pp. 77-79). At the last node, player A_2 will choose a pacifist strategy even if A_1 adopts an aggressive strategy, since given the imminent date of liberation, the adoption of a strategy of aggression by A_2 will cost him more. Hence at the next-to-last node, A_1 chooses to adopt an aggressive strategy given that his pay-off will be more if A_2 behaves pacifically, and so on till the first node. Then it can be 'predicted' that A_1 will begin by adopting an aggressive strategy and A_2 will respond by a pacifist strategy. This is, of course, a pretty bad prediction given the importance of building a reputation of a 'tough guy' by A_2. To rectify this bad prediction, one should introduce the *belief* of each player about the way the other player may behave with a given probability. This brings us to another type of equilibrium which Kreps (1990, pp. 536-543) analyses under the title of 'Reputation redux: Incomplete information'.

[x] North (1977) also interprets Polanyi's 'forms or patterns of integration' as 'markets and other allocation systems'. He suggests an explication of different 'allocation systems' in terms of transaction costs.

[xi] The notion of biopiracy has been severely criticized recently as an alarmist exaggeration or a misguided reading of the IPR (Taubes, 1995; Zaitlen and German, 2000a,b; Chen, 2006). Obviously, this notion will always be controversial, since the dispute about whether someone should be called a 'pirate' or 'promoter of science' and 'public good' is really about who has the power. St. Augustine's reflections regarding the 'pirate and emperor' are illuminating: "For elegant and excellent was the pirate's answer to the great Macedonian Alexander, who had taken him: the king asking him how the durst molest the seas so, he replied with a free spirit, 'How darest thou molest the whole world? But because I do what a little ship only, I am called a thief: thou doing it with a great navy, art called an emperor.'" (quoted in Pérotin-Dumon, 1991, p. 196). One can easily imagine that after 'patenting' the traditional knowledge of the Indian people about the Neem tree (its scientific name *Azadirachtin Indica* is derived from the Persian words *Azad Darakht* which means free tree), the giant pharmaceutical corporations accuse them later of 'pirating' the 'patented' knowledge which is basically their own knowledge. Of course, if science looks for 'shared conventions' to claim 'neutrality', then there will never be a science about piracy and *a fortiori* regarding biopiracy.

[xii] Chen (2006, p. 5) who has adamantly decided "not to praise the biopiracy narrative, but to bury it" alludes to the Neem tree story. Astonishingly, however, he keeps silent about the fact that the patent was revoked since the 'inventive step' could not have been proved, and according to the European Patent Convention, it did not also meet the 'morality' criterion. While Chen generously recommends that 'traditional knowledge' should be kept within the 'public domain' (p. 24), he expresses his profound regrets about the "novel and economically senseless solution of proprietary status for traditional knowledge of biological properties and applications." But what about an unjustified claim of 'novelty' for issuing a patent when there already exists 'traditional knowledge' about the so-called 'invention' as in the case of the Neem tree? "It may be enough simply to ensure that alleged facts of biopiracy do not form the basis for patents under existing intellectual property laws." (p. 28). He prefers to be 'socialist' with regard to the utilisation of 'traditional knowledge' in the South, but an ardent partisan of 'private property' when it comes to patenting for the North.

[xiii] Zaitlen and German (2000a, p. 66) contest the notion of biopiracy, since "'life' – such as the transgenic mouse, the Mo cell line, and Brazzein sweetener – are human inventions…It had to be invented before our patent laws would allow Harvard to patent it in the first place." Apart from the unjustified notion of 'patenting human cells', one finds no clue whatsoever why the Hagahai blood cell or the traditional knowledge of the Indian people about the Neem tree should be regarded as an 'invention' of the US government or pharmaceutical corporations.

[xiv] During the eighteenth and nineteenth centuries, the state of no property was claimed by England over the 'free international seas' to legitimise its naval hegemony and pirating activities. Sovereignty is a territorial-land concept which has never been applied over the seas. As Pérotin-Dumon (1991, p. 203) rightly remarks: "There is no authoritative definition of international piracy". Presently, the state of no property (*res nullius*) is posited for outer space by the new "US National Space Policy" (2006) so that the monopoly of the US should be justified: "The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitation on the fundamental right of the United States to operate in and acquire data from space."

[xv] The French comedian Coluche used to define 'theft' as 'finding something that has never been lost'.

[xvi] Schlicht (1998, pp. 217-41, 276-77) is inspired by Polanyi's *integration forms* though he employs 'modes of control' as a synonymous expression to delineate different types of coordination, namely 'exchange, command, and custom' (in his terminology) within a firm or a society.